Mobile Augmented Reality in Educational Environments

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Abstract

The possibility of using Augmented Reality (AR) in learning and training has become more straightforward than before, as a result of the extensive use of ICT in the computer and mobile industries. Even though AR is used in education, and a general acknowledgement it has a positive impact on learning outcomes, the value of integrating AR applications into learning environments has not yet been fully investigated (Diegmann et al., 2015). This study considers the Integration of AR technology into nursing clinical lab training, introduces new ways of interacting with the manikins and allows students to view patient scenarios instead of relying on teacher explanations. AR it allows students to visualize hidden objects such as internal organs, which makes simulations more realistic and immersive. The study aim to investigate the potential of this technology in term of improving nursing students' self—learning

Keywords: Augmented Reality; Mobile Learning; Technology Acceptance; Higher Education; Self-learning; TAM.

1 Introduction

Nowadays, the world is getting smarter than before. Smart devices surround us and humanity is becoming dependent on them. Smart devices have the major advantage of providing access to the Internet anytime, anywhere and for any purpose. One of the new technologies is Augmented Reality (AR), which creates virtual extra layers on physical objects. It allows digital information to be incorporated into the real environment by blending those two worlds together (Lee, 2012). AR offers new learning opportunities, integrated with mobile applications, and smartphone devices can be used as AR tools to support interactive learning. Increasing interactivity as an individual AR benefit introduces new ways of interaction between learner and learning tools (Diegmann et al., 2015). Radu (2012) explored how the positive learning effects of AR in education increase content understanding, improve long-term memory retention, and increase student motivation and self-learning

2 Theoretical Background

Researchers have shown that self-regulation is the predictor that best explains both learner achievement and learning environment (Balapumi, 2016). Furthermore, self-regulated students are more inclined to transfer successfully their knowledge from an e-learning system into real-world situations. Zimmerman (2002) indicated that students with poor self-regulation skills are not as academically successful, whereas

successful students are more likely to be self-regulating. So, integrating AR within the learning process will enhance reality rather than completely replace it, and display useful information that is not directly detected by students' senses in real time (such as human organs for nursing students). This will also help them to perform real-world tasks, and facilitate their understanding of complex scenarios independently. Together, those benefits lead to improve students self-learning. However, there have been none studies determining the relationship between AR technology and students' self-learning. This study will address this gap by investigating nursing students' acceptance and system usability and their influence to students' self-learning.

3 AR Acceptance Model

According to Liaw & Huang (2013), user satisfaction in the human-computer interaction area is related to students' attitudes toward the learning system, which influence their acceptance of the system. Due to AR still being in the early stage of adoption in education, there have been few studies investigating students' acceptance of mobile AR learning. Particular aspects have been added to the traditional technology acceptance model (TAM) based on the limitations of TAM for mobile AR (Haugstvedt & Krogstie, 2012). The revised TAM model for AR environments shows that perceived enjoyment plays an essential role in determining the actual user intention to accept mobile AR systems

4 Conceptual Model

Wojciechowski & Cellary (2013) stated that the positive attitude of learners to AR technology was its novelty, but that it might fade with time. They explained that the successful acceptance of AR technology in learning would greatly depend on the quality of AR learning environments. Thus, evaluation of an AR system is essential, and usability tests will be integrated into this study. Usability refers to how well students use the system to accomplish learning tasks and achieve learning outcomes.
The following new research model (Fig. 1) has been constructed to support self-learning by divided the study into three phases. Phase (1) will investigate nursing students' acceptance of the new AR technology by utilizing new version of TAM model. Second phase will evaluate the system usability by using subjective and objective measurements. Finally, determine whether system usability and students acceptance will have positive impact on students' self-learning skills or not.

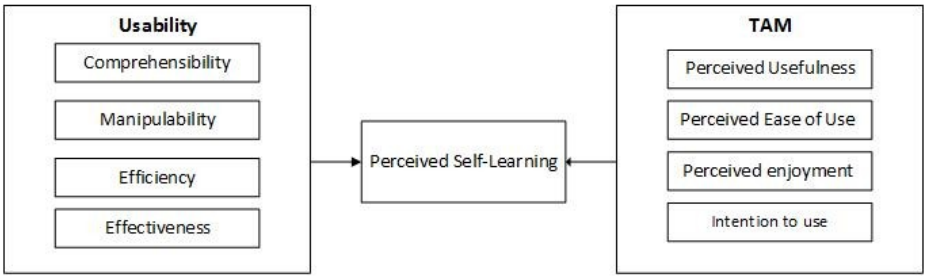

Fig. 1. Research Model

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